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A General Comparison of SharePoint 2007 and SharePoint 2010

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ABSTRACT

SharePoint is a Microsoft product for cooperative and collaborative work. It is becoming an increasingly important technology to Defence, and in particular to Joint Project 2030, where it underpins the JCSE System Infrastructure. SharePoint 2010, the latest version, offers significant increases in capability over its precursor SharePoint 2007. This report seeks to review the differences in capabiliy offerings between the two versions, focussing in particular on integrating external information into a SharePoint environment, reflecting our key area of investigation thus far. We make note of the later release's tighter integration to the Microsoft Office suite of tools, as well as touching on SharePoint Designer and Microsoft InfoPath. We conclude with some cautionary comments regarding the implementation of a SharePoint information architecture in Defence.

RELEASE LIMITATION

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A General Comparison of SharePoint 2007 and SharePoint 2010

Executive Summary

SharePoint is a Microsoft product for cooperative work and teamwork collaboration, supported through a browser-based interface. We see this technology becoming increasingly important to Defence, and in particular to Joint Project 2030, where it underpins the Joint Command Support Environment (JCSE) System Infrastructure.

It is expected that the latest version, SharePoint 2010, will soon become the version of choice within Defence systems based on the product. This expectation does not, however, address the question of whether it is the best fit for Defence requirements. SharePoint 2010 offers significant increases in capability over its precursor SharePoint 2007, but we are unaware of any definitive investigation of this capability increase. In this report we seek to demonstrate that these functionality improvements suggest that in many cases SharePoint 2010 is a better fit to Defence needs.

This report sets out to review the differences in capabiliy offerings between the two versions, focussing in particular on integrating external information into a SharePoint environment, reflecting our key area of investigation thus far. We make note of the later release's tighter integration to the Microsoft Office suite of tools, as well as touching on SharePoint Designer and Microsoft InfoPath. We conclude with some cautionary comments regarding the implementation of a SharePoint information architecture in Defence.

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Abbreviations

AD	Active Directory
BCS	Business Connectivity Services
BDC	Business Data Catalog
BI	Business Intelligence
BMS	Business Management System
CQWP	Content Query Web Part
CRM	Customer Relation Management
CSS	Cascading Style Sheet
DB	Database
DIE	Defence Information Environment
DVWP	Data View Web Part
FTP	File Transfer Protocol
HTML	HyperText Markup Language
ID	Identifier
IIS	Internet Information Services
IT	Information Technology
JCSE	Joint Command Support Environment
JSI	JCSE System Infrastructure
LOB	Line Of Business
MSDN	Microsoft Developer Network
OLE	Object Linking & Embedding
OOTB	Out of the Box
REST	Representational State Transfer
RSS	Really Simple Syndication
SOAP	Formerly "Simple Object Access Protocol", SOAP is now a noun
SPD	SharePoint Designer
SQL	Structured Query Language
SSO	Single Sign On
SSS	Secure Store Service
WCAG	Web Content Accessability Guidelines
WCF	Windows Communication Foundation
WSS	Windows SharePoint Service
XLV	XSLT List View Web Part
XML	eXtensible Markup Language
XSL	eXtensible Stylesheet Language
XSLT	eXtensible Stylesheer Language Transformations

1. Introduction

SharePoint is a Microsoft product designed to support team collaboration, cooperative work and browser-based information sharing. It offers capabilities such as discussion forums, calendars, contact lists, shared document libraries (as an alternative to network file shares[1]), task / activity tracking lists, meeting recording (agenda, attendees, decisions, outcomes, and minutes) as well as a number of capabilities traditionally associated with Social Computing, namely blogs and wikis. It is being taken up at a rapid rate across commercial industry and may be in a position to supplant an array of products jointly employed for Enterprise Content Management (ECM) in a significant number of organisations.

SharePoint is likewise becoming increasingly important for Defence. In 2011, INFORMATION DEFGRAM No. 766/2011 announced CIOG's "Collaboration as a Service" rollout of SharePoint 2010 to the Defence Restricted Network. Perhaps more importantly, the JP2030 project is underpinning the JCSE[2] System Infrastructure (JSI) with SharePoint. This makes SharePoint a critical component for the project deliverables. The JSI is also potentially the first ever instance of employing SharePoint as the framework for a C2 application suite.

Figure 1 below shows one view of the evolution of SharePoint utilisation in organisations.
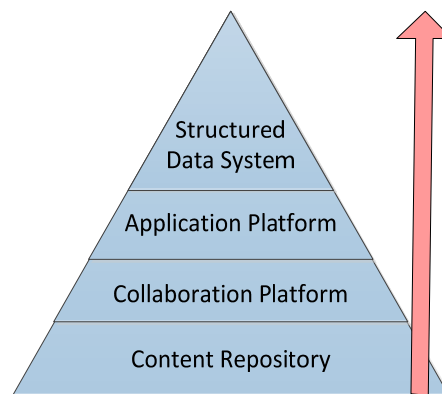
Figure 1   Organisational Evolution of SharePoint Utilisation[3]

At this time Defence could be considered to be only at the lowest level where SharePoint is being used only as an alternative to network file shares. The aforementioned INFOGRAM can be seen as a precursor to the organisation moving to the second level, whereby SharePoint becomes employed by the organisation to fulfil its canonical role. The ambition of the JP2030 project is to employ the SharePoint platform at the highest tier in the evolutionary pyramid, as a structured data system.

SharePoint 2010 provides some significant improvements over its precursor version, SharePoint 2007, and these forward steps can be potentially useful to Defence in achieving the ambition of the JSI more broadly. In this report we seek to set out some of the capability improvements of the later product by contrasting it against its precursor version. In doing so we hope to inform not only the JP2030 project of the capability gains of the latest version of

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[1] *i.e.* mapped network drives shared between teams
[2] *i.e.* Joint Command Support Environment
[3] adapted from (Coccia, 2012)

the product, but also highlight some concerns that should appropriately be addressed in delivering the implementation of the JSI. Such advice may be more broadly applicable in Defence in any instances where SharePoint is being deployed and utilised.

In the report we first make note of some of the aesthetic improvements of SharePoint 2010, then move to consider the functionality on offer, focussing in particular on integrating a SharePoint environment with data that is external to the SharePoint system itself[4]. After considering a (non-exhaustive) coverage of the functionality, we discuss the integration of SharePoint with Microsoft's productivity tools (i.e. the Office suite of products). Finally we discuss two associated technologies: SharePoint Designer, an application for the design and management of SharePoint sites, and InfoPath, a form design and population application which is readily integrated into SharePoint sites and site components. Lastly we present some cautionary notes in our conclusion.

2. General Changes

2.1 Aesthetic

SharePoint 2010 adopts the Fluent User Interface ("Ribbon") introduced with the Microsoft Office 2007 suite. The Ribbon replaces the drop-down menus and toolbars present in SharePoint 2007 with buttons grouped by functionality. The buttons are displayed in a tab bar across the top of the SharePoint 2010 page. Figure 2 and Figure 3 below show the difference between a SharePoint 2007's List navigation interface and SharePoint 2010's List Ribbon interface.
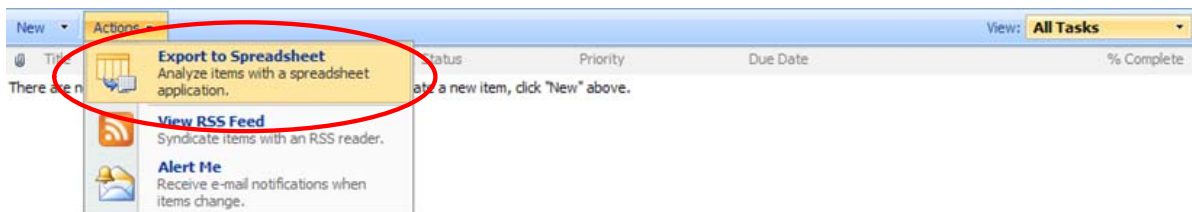
Figure 2   SharePoint 2007 Toolbar Example
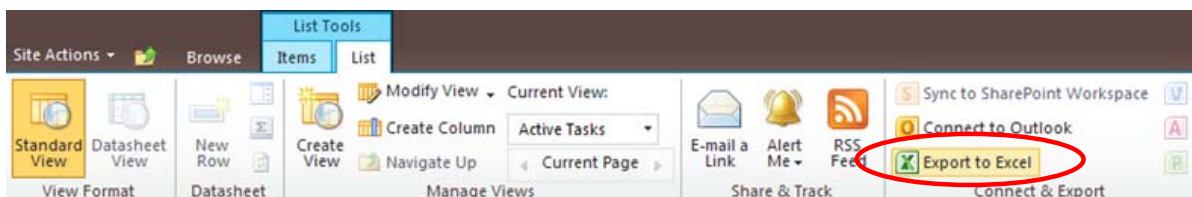
Figure 3   SharePoint 2010 Ribbon Example

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[4] This focus reflects a bias in our program of work; however, it is a crucial aspect of implementing SharePoint environments successfully in Defence, where data may not be amenable to migration into SharePoint internal data storage. There are, in fact, significant reasons for *not* migrating data to be internal content to the SharePoint system, such as preserving access to the data from other Defence applications.

The ribbon seeks to support ease of use for the end user by improving navigation across the SharePoint site and delivering a better designed interface for accessing page and list actions[5].

2.2 Social Networking

SharePoint 2010 adds some social networking capability including the ability to create team Blogs, Wikis, tag relevant content, "like" pages[6], insert status updates and search for people (other users of the SharePoint site). Central to the social networking capability is the improved User Profile page. SharePoint 2010 enhancements to the basic profile pages delivered in SharePoint 2007 include:

- A dynamic organisation chart that updates automatically to reflect organisational changes;
- A dynamic activity stream – akin to Facebook or Twitter – which displays a feed of the user's activity; and
- A record of tags and notes – a user can tag (or make notes on) pages or items using the ribbon bar on any SharePoint site. The tags and notes are then displayed on the user's Profile Page.

A visual comparison of the My Sites versions is presented in Appendix A.

2.2.1 Wiki Pages & Blog Sites

SharePoint 2010 allows easier authoring of pages and content by a user community by providing a limited form of Wiki page. While not as feature rich as some dedicated Wiki offerings, e.g. Confluence, appropriately authorised users can collaboratively develop content.

Unlike Wiki pages, Blog sites were provided in SharePoint 2007. There does not appear to be significant changes in the Blogging functionality between the two versions of SharePoint, although it is enhanced in the later offering, in particular the Media Web Part permits the addition of rich multimedia files (audio, videos) directly to Wiki pages.

SharePoint 2010 Blog and Wiki sites are a type of Document Library with a different presentation layer provided to meet the functionality requirements (such as versioning) for Blogs and Wikis. As such, much of the Document Library functionality available in SharePoint for Blog or Wiki sites is built upon that technology.

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[5] In the one study we have been able to find on user acceptance of the Ribbon interface (Dostál, 2010), the following hypotheses were supported: *that the Ribbon UI is better accepted by younger users* (only partially supported), and *that more experienced or more intensive (word processing application) users are less satisfied with the Ribbon UI*. The hypothesis that *less experienced users find switching to the Ribbon UI from classical WIMP(Window, Icon, Menu, Pointing device) UI easier* was unsupported. Dostál concludes, however, that the overall user acceptance of the Ribbon interface, apart from the groups identified above as less satisfied, is well received and as such the biggest issue with the Ribbon is the need to become accustomed with the redesign of the user interface. Further qualitative and quantitative analysis is required, in particular evaluation of task times, user command selection speeds, and error rates.

[6] This is akin to the social computing functionality of tagging a page as a particular favourite. Unlike the informal Facebook-related verb usage, in this instance "like" means to tag the page so as to be able to refine the user's searches and filter other search results out from tagged pages.

2.3 Office SharePoint Workspace 2010

SharePoint Workspace 2010 replaces Office Groove 2007 as the tool facilitating offline work with SharePoint content. Some significant differences between these two tools are as follows:

- SharePoint Workspace 2010 uses Windows credentials instead of a Groove-specific logon for authenticating users, thus improving consistency with the rest of the Office suite;
- The nature of the synchronised cache led to the removal of Groove 2007's Connect tool;
- Groove 2007 Forms Designer has been removed in favour of the InfoPath 2010 product (see §10 below): and
- User interaction mechanisms such as Communicator 2007 integration has been replaced with Office-based integration.

2.4 Internet Explorer Version Compatibility

SharePoint 2010 is incompatible with Internet Explorer 6 (IE6)[7] as a result of some of the new features such as the Ribbon toolbar. Also, SharePoint 2010 employs client side artefacts that are not correctly executed or appropriately rendered in IE6 (but are supported in Internet Explorer 7 and above). It is advisable to upgrade from IE6 to avoid these problems. There is an inbuilt SharePoint control that, if placed on the master page, prompts the user to upgrade their browser[8] if running IE6 and attempting to view a SharePoint 2010 page. If use of IE6 is unavoidable then consult Table 1 below to see which common features are (and are not) supported.

Table 1 Features of SharePoint 2010 in IE6[9]

Functionality	Supported in IE6
Ribbon navigation	✘
Creating a site	✔
Creating a list or library	✔
Workflows	✔
Visio Workflows	✘
My Sites	✘
Search	✔/✘ - Portal search and WSS search work. People search displays incorrectly.
Viewing tags	✔
Adding tags	✘
BDC Web Parts	✘
Excel Services	✘
Office Web Apps	✘
Access Services	✘
Central Admin	✘

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[7] An example of the presentation differences between a SharePoint 2010 page in IE6 and IE7 can be seen here: <http://blogs.msdn.com/b/maximeb/archive/2010/04/01/what-sharepoint-2010-looks-like-with-internet-explorer-6.aspx>, viewed 1 May 2012.

[8] Example of control found here: <http://blog.drisgill.com/2009/11/sp2010-branding-tip-5-handling.html>

[9] adapted from <http://blogs.msdn.com/b/maximeb/archive/2010/07/30/what-can-work-with-internet-explorer-6-and-sharepoint-2010.aspx>, viewed 1 May 2012.

3. Business Data Connectivity

Both SharePoint 2007 and SharePoint 2010 can access data stored in external data sources (i.e. Line of Business (LOB) data), however the related functionality provided by SharePoint 2010 is much increased over the earlier version.

SharePoint 2007 has only limited capacity to access and manipulate external data since it provides only read-only access (i.e. no Out of the Box (OOTB) mechanism for read/write access) to external SQL Server databases and other LOB data. It is unable to surface external data in lists. SharePoint 2007 uses an OOTB Business Data Catalog web part or a custom web part to display the data (see §3.1)

An overview comparison of the data connectivity functionality is presented at Table 2 and SharePoint 2010 external data connectivity functionality is described in more detail in §3.2.

SharePoint (both 2007 and 2010), by default, stores content data in its own data store (Content database). Since SharePoint does not readily expose the content data[10] to external systems, users are constrained to using the SharePoint interface for data manipulation.

Table 2 Comparison of SharePoint 2007 and SharePoint 2010 External Data Connectivity

Functionality	Corresponding SharePoint Feature	
	SharePoint 2007	SharePoint 2010
Read access to external SQL databases	• Business Data Catalog	• Business Connectivity Services
Write access to external SQL databases	None	• Business Connectivity Services
Connectivity to SOAP Web Services	Read-only	• Data-Sources in SharePoint Designer
Read / write connectivity to WCF Web Services	None	• Business Connectivity Services • Data-Sources in SharePoint Designer.
Read / write connectivity to .NET solutions	None	• Business Connectivity Services
Display external data in Lists	None	• Business Connectivity Services • External Lists

3.1 Data Connectivity in SharePoint 2007

The Business Data Catalog (BDC) is a feature of SharePoint 2007 that provides an easy way to integrate business data within SharePoint Server 2007 without writing any code (MSDN, 2007). It is presented as a custom web part that allows the user to connect to an external data source to access customised data. BDC facilitates connectivity with specialised business programs such as BMS (Business Management System) and CRM (Customer Relation Management) systems, SOAP web services and databases.

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[10] Through APIs or web service interfaces, for example. We believe that Internal List data is accessible through, *e.g.* RSS feeds that can present the data to other systems (such as PerformancePoint Dashboards) but have not explored this capability in any detail. Such access to list content is read-only to the best of our knowledge.

To utilise the BDC developers require both SharePoint Server 2007 and Microsoft SQL Server 2005 to be installed on their machine. Once access to the BDC has been gained the LOB metadata, must be defined in an XML file. This metadata is imported to SharePoint's Central Administration (included in SharePoint Server 2007 installation). Once the data source is defined[11], any user with access to the SharePoint webpage will be able to use the Business Data Catalog object to access data from the defined data source.

The main impediment to using SharePoint 2007 for data manipulation is the lack of data integration and functionality due to the limitation of having only read-only capability. Additionally, RESTful web services are not accessible using BDC in SharePoint 2007, which restricts the types of data sources that can be accessed.

3.2 Data Connectivity in SharePoint 2010

Microsoft introduced Business Connectivity Services (BCS) into SharePoint 2010 as an evolution of the Business Data Catalog (BDC) from SharePoint 2007. BCS allows a SharePoint 2010 site to access a wider range of external line of business data than was previously possible as well as adding increased functionality (*e.g.* External Lists). If the credentials used to access the external data have the correct permissions, the user will have both read and write access. SharePoint 2010 BCS is underpinned by the Business Data Connectivity model[12], which allows integration with Microsoft Office 2010 products. BCS provides connectivity to the following:

- SQL Server databases;
- .NET Assembly data providers; and
- WCF Web Services.

SharePoint 2010 also includes Data Sources, which have similar functionality to SharePoint 2007's BDC. Data Sources can be used in the same way as the BDC – they provide a read-only capability for exposing external data. The external data can then be surfaced in web parts. Data Sources provide connectivity to the following:

- Databases (SQL Server and OLE DB);
- SOAP Web Services;
- REST Web Services; and
- XML Files.

Data Sources differ from BCS in that they only provide read-only access to external data and are unable to be surfaced in External Lists.

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[11] This process is more fully detailed on the MSDN website <http://msdn.microsoft.com/en-us/library/bb410048(office.12).aspx>

[12] It is important to note that SharePoint 2007 provided the Business Data *Catalog* (BDC), which confusingly shares an acronym with the SharePoint 2010 Business Data *Connectivity* model, an XML file that contains sets of descriptions of one or more external content types, their related external systems, and information that is specific to the environment, such as authentication properties. In SharePoint 2010 the Business Data Connectivity service is the new version of SharePoint 2007's Business Data Catalog.

Figure 4 shows the different connectivity options when using BCS in SharePoint 2010. The SharePoint 2010 BCS service is contained within the SharePoint 2010 server. Authentication against the external system – in addition to the usual SharePoint site authentication – is required to access external data sources (see §5.2)

The addition of BCS to SharePoint 2010 presents the opportunity for full integration with external data. Although internal (content) data remains difficult to access from outside SharePoint, facilitating SharePoint access to external data – through external content types and External Lists – allows LOB data to reside in its native system and yet be available for SharePoint applications to exploit as well. As such an information architect has the choice to structure the system in design stage to best exploit the capabilities of internal list functionality (*e.g.* direct association of workflows), or to benefit the system ecology by externalising data.

Externalised data can reside in non-content databases, and hence be made accessible to other systems, or exposed to other systems through web services built atop the external database. In others words without externalised data the potential for integration with other systems is minimal. The addition of BCS allows data to reside in an external database with data access achieved through one of the three provided mechanisms. In the context of the DIE this is a huge advantage as SharePoint can now be integrated with other business systems without them necessarily needing to be SharePoint-based.
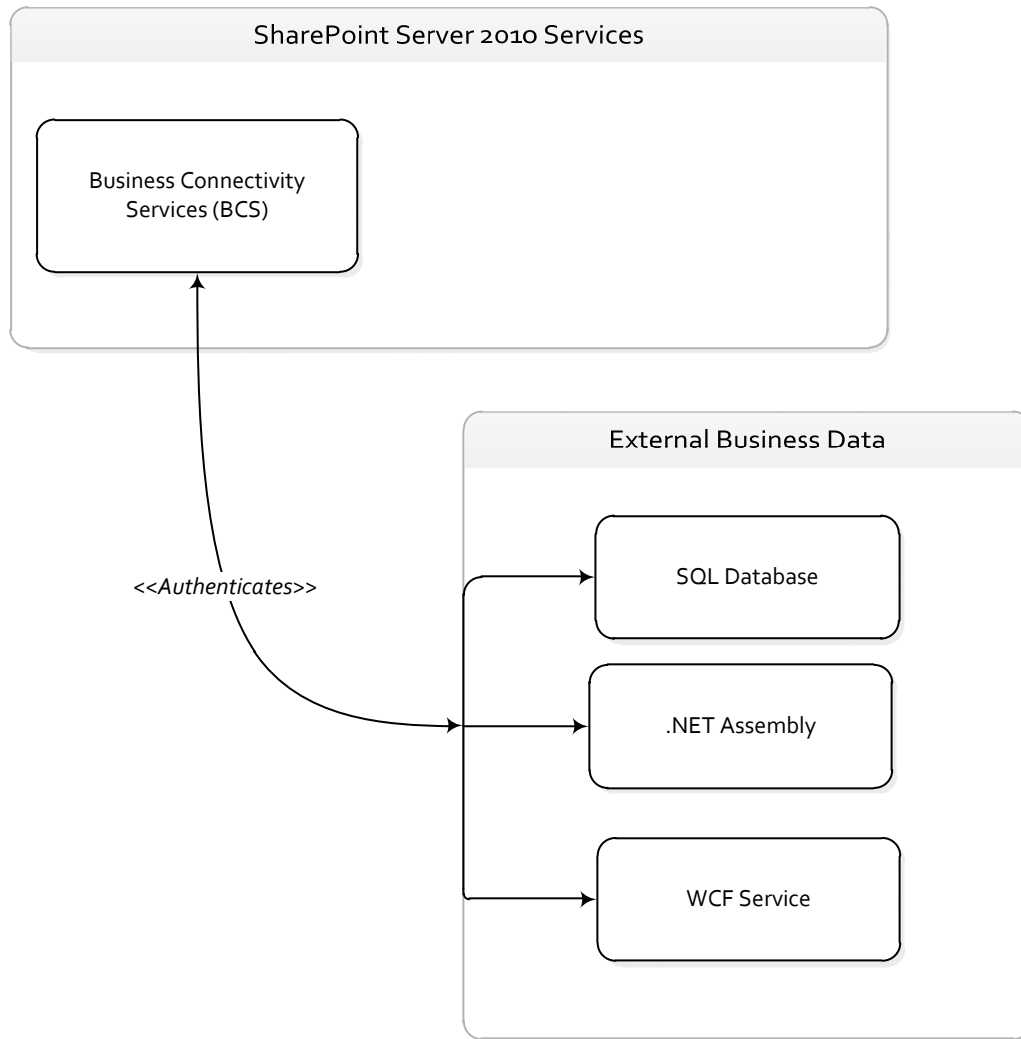
Figure 4   Connectivity Options of BCS

Figure 5 (below) demonstrates the difference between SharePoint Content databases and External databases. It shows the ability of an External SQL Server database to be used by both external applications and within BCS. The diagram also shows that non-SQL Server databases not compatible with BCS may still be employed to ingest data into SharePoint 2010 through read-only Data Sources.
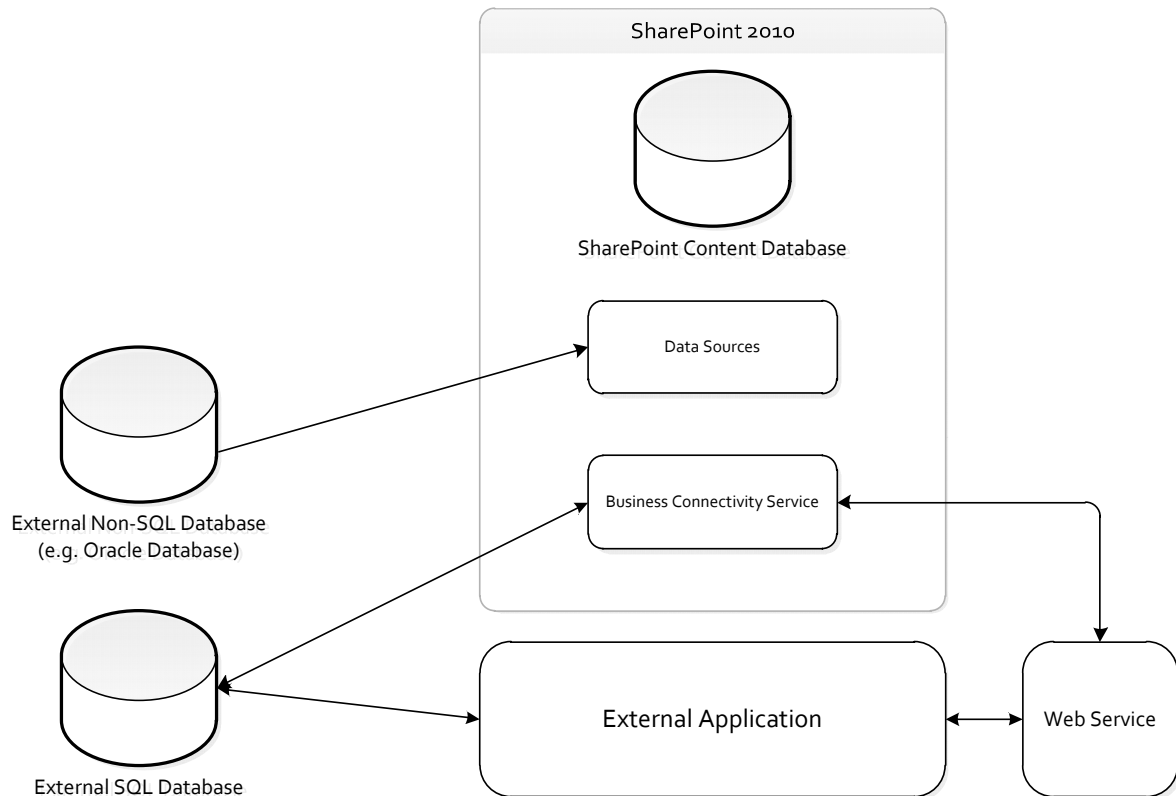
Figure 5   Accessing Internal and External data in SharePoint 2010

4. Lists

4.1 External Data Lists

External Data Lists (External Lists) have been introduced in SharePoint 2010 to use external data (via BCS). They display data in a manner which mimics the presentation of an Internal List; as such External Lists appear to the end user, on the surface, to be identical to Internal Lists. Under the presentation layer there are restrictions on how External Lists can be manipulated and configured. A summary of the differences between Internal and External List functionality is shown below in Table 3. A major disadvantage of External Lists is that unlike Internal Lists, they cannot be directly associated with workflows. External Lists also lack much of the inbuilt SharePoint 2010 List functionality such as RSS support, REST access and the ability to alert subscribed users to changes in the data[13].

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[13] Such functionality could be provided by external applications (as shown in Figure 5 above) operating over the same external data source as the External List, but this does not obviate the fact that the List itself cannot natively provide the functionlity.

Table 3 Functionality differences in SharePoint 2010 Internal and External Lists

Functionality	Internal Lists	External Lists
Transactions	✘	✔
Full cross list views	✘	✔
Aggregation queries	✘	✔
DISTINCT Queries	✘	✔
Field Level (column) security	✘	✔
BI data source	✔	✔
Linked Data Source	✔	✔
XSL Transform presentation	✔	✔
Workflow Integration	✔	✘
REST access	✔	✘
RSS support	✔	✘
List or list item events	✔	✘
Alerting functionality	✔	✘

4.2 List Presentation

In addition to the aesthetic changes between SharePoint 2007 and SharePoint 2010 discussed above (§2.1) the presentation of Lists changed in SharePoint 2010. SharePoint 2007 provided a toolbar at the top of a list view that contained multiple drop-down menus, allowing manipulation of the list by navigating the drop-down menus. This interface was not ideal as sometimes functionality would be obscured. SharePoint 2010 eliminates this problem through use of the ribbon interface. As Appendix B shows, navigation is much simpler in a SharePoint 2010 list.

In addition, (internal) lists and libraries are presented using a new Web Part, the XSLT[14] List View Web Part (or XLV). In addition to improved functionality, performance and rollback (reverting to the original XSLT formatting), the user interface has been improved. Filtering, sorting and grouping are now able to be controlled and performed client-side. The improved capability of XLVs is not available for certain list types, such as lists created from linked data sources, which instead are displayed with Data View Web Parts (DVWP) or cross-site data sources which can be performed with Content Query Web Parts (CQWP). Both the latter types of web parts existed in SharePoint 2007.

5. Security

5.1 Site Security

General site security remains unchanged in the move from SharePoint 2007 to SharePoint 2010. Both allow the ability to manage permissions on individual lists, list items, libraries, sites and pages. This allows a smooth migration of permissions from SharePoint 2007 to SharePoint 2010.

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[14] Extensible Stylesheet Language (XSL) Transformations, available at http://www.w3.org/TR/xslt20/, last updated 23 January 2007, viewed 24 April 2012.

SharePoint 2010 introduces Claims Based Authentication. This means that there is ability for a user to authenticate using credentials other than Active Directory (AD). For example, SharePoint 2010 allows a user to log into a SharePoint site using their Windows Live ID. This ID is fully external to SharePoint and AD. It creates a seamless browsing experience when using a Live ID for other Microsoft Sites (i.e. MSDN). This is unlikely to be a good option for a Defence-hosted SharePoint site due to network security constraints.

5.2 Credential Management

SharePoint 2007 provides credential management functionality in its Single Sign On (SSO) capability. The SSO in SharePoint 2007 is perhaps misleadingly named; it does not operate like a true single sign-on protocol. A true single sign-on allows a user to be logged in across multiple systems without being prompted to log in when switching between systems. SharePoint 2007's SSO, acting as a proxy, allows a user to access external data sources using stored credentials. The SSO credentials can either be mapped to a single account (group credentials) or individual accounts (individual credentials). These accounts can either be Windows or basic (non-Windows) credentials and are defined by a server administrator.

SharePoint 2010 introduces the Secure Store Service (SSS) as a replacement to SharePoint 2007's SSO. The SSS is a claims-aware authorisation service which stores credentials. SSS allows multiple users to log on to an external system using a single user's credentials. The SSS is located within SharePoint Server, and can be used in conjunction with the BCS to access external business data. Figure 6 below illustrates how BCS authentication to external data sources through SSS is achieved. Users must be authorised to connect to external data using BCS. BCS provides credential management for both individual External Content Type objects and the entire metadata store. If they use only their Windows authentication to access, e.g., External Lists, those accounts must be authorised to access the external data source. It is often infeasible for all such users to have access to the external data sources. The use of the SSS can provide the required access to the external data without giving the user direct access to the data source level.

If using the SSS, all operations using BCS for External Lists operate with only one set of credentials. This means all changes to the External List will be seen to be made by the same person, even if in reality it is being done by several users.
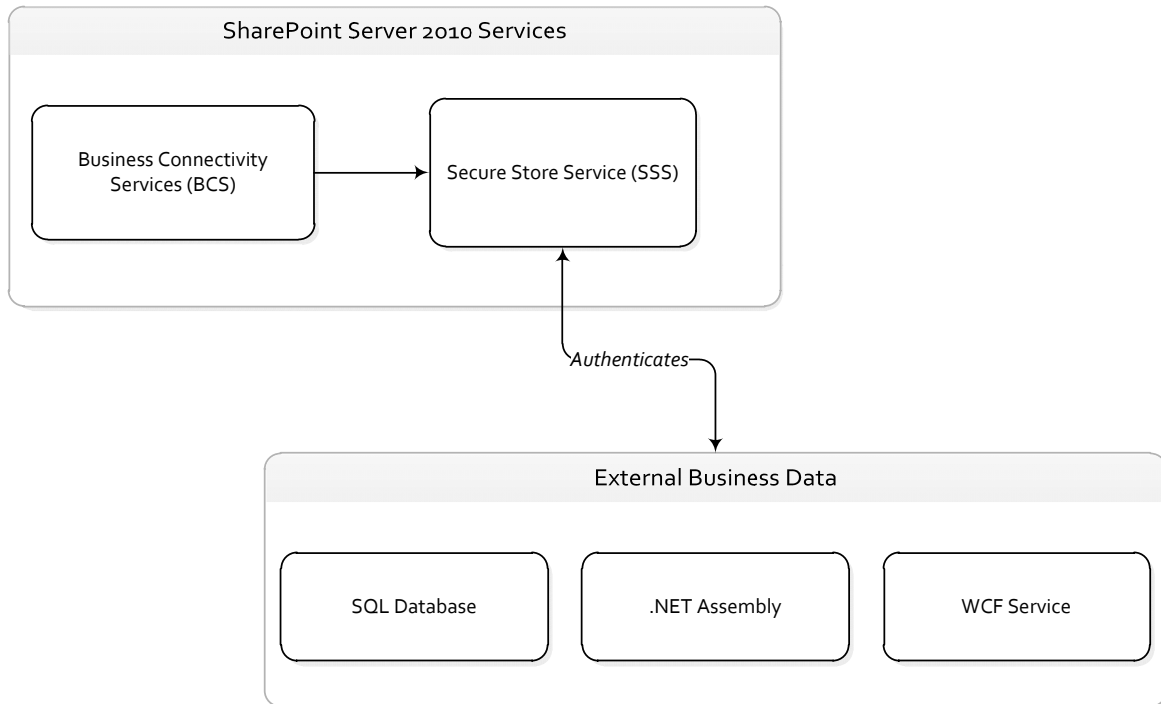
Figure 6   Connectivity Options of BCS (with SSS)

The Secure Store Service can also be used to provide elevated access to an external data source through an account with higher access. In the example shown below in Figure 7, any number of users or groups with restricted privileges can be given access to an External Data Source. They are able to manipulate the data with the same capability as the fully authenticated user. This elevated access only is provided through the SharePoint user interface; it does not give the restricted users the ability to connect to a Data Source outside of SharePoint.
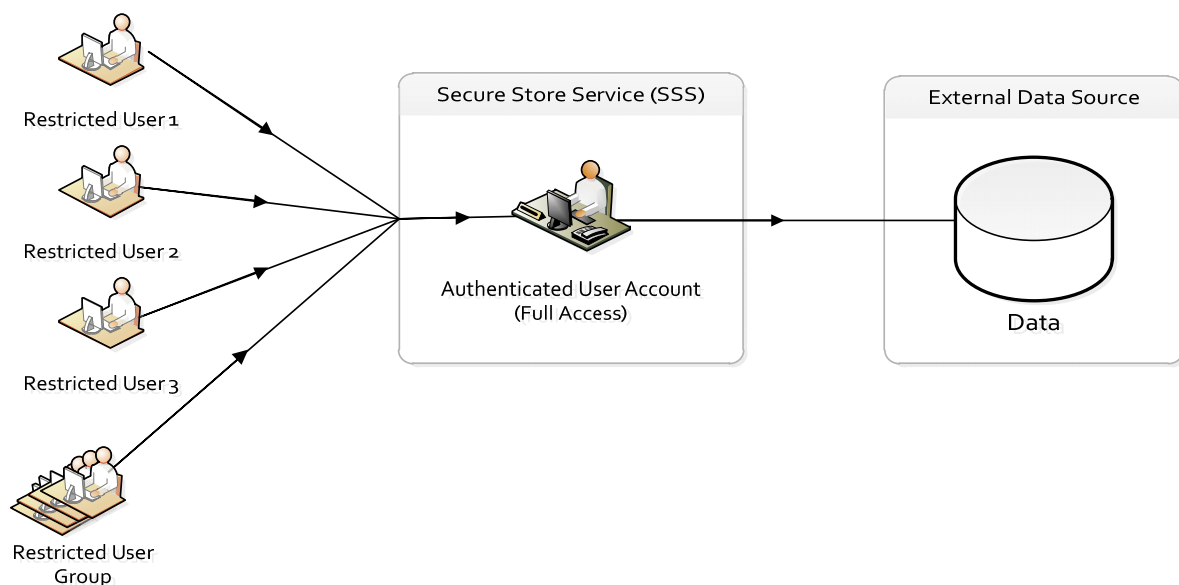
Figure 7   SSS Providing Elevated Permissions to an External Data Source

Although they are named differently, SharePoint 2007's SSO and SharePoint 2010's SSS perform the same functions, differing primarily in ease of use. SharePoint 2007's SSO requires the user to create an encryption key for each of the credentials whereas SharePoint 2010 does this automatically. The management interface for SharePoint 2010's SSS is also simpler to use.

6. Application Development

Both SharePoint 2007 and SharePoint 2010 support custom code (within *SharePoint Solutions*) that can be deployed onto SharePoint farms[15] (see below). SharePoint Solutions are a bundle of all of the components of a SharePoint project into a single file ("Solution package"). A SharePoint Solution can be used to package and deploy customised web parts[16]. Custom web part development for SharePoint 2007 and SharePoint 2010 can be done via Visual Studio. Custom development for SharePoint 2007 was originally implemented in Visual Studio 2008, which was sufficient for creating web parts without extensive user interfaces for SharePoint 2007.

Visual Studio 2010 is designed to be used with SharePoint 2010 and provides the means to create a "Visual Web Part". A Visual Web Part allows the creation of a web part with a user interface by using drag and drop. Development of a web part would have taken considerably more effort to implement in Visual Studio 2008.

SharePoint 2010 also provides a new type of SharePoint Solution – a Sandboxed solution. SharePoint 2007's SharePoint Solutions are implemented as Farm solutions. Farm solutions grant full trust privileges to the Solution and can be deployed across multiple SharePoint farms. Sandboxed solutions allow code to be developed that does not require full trust privileges over the farm. This allows a programmer without farm administrator rights to be able to produce web parts. Additionally, running at a limited security level, within an isolated web application ensures that the rest of the SharePoint site is protected from unsafe behaviour in the code. Sandboxed solutions are constrained in functionality, and some SharePoint Solution projects (such as Visual Web Parts) are unavailable for use. Certain programmatic functions are denied to sandboxed solutions, unless they are permitted to run at an elevated privilege level. This improves the range of functionality available to the Solution while retaining the safety of the sandboxed solution. It also allows exposure of new developed functionality without full engineering investment (e.g. using agile development).

7. Workflows

Both SharePoint 2007 and SharePoint 2010 support the creation of workflows. They can be created in-browser, in SharePoint Designer and programmatically through a Visual Studio Solution. SharePoint 2010 provides an improvement over SharePoint 2007's workflows. It allows a simpler developer experience creating workflows with Visual Studio 2010. Workflows are also able to be created within Visio 2010[17] or PowerPoint 2010 and then

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[15] A SharePoint farm is a collection of one or more SharePoint servers and one or more SQL servers that share common resources. Each farm has a single configuration database which can be managed via Central Administration. Farms are typically stand-alone, but can provide or receive functionality from another farm.

[16] A web part is an ASP.NET server control that can be added to a SharePoint page.

[17] NB: This requires Visio 2010 Enterprise level licenses.

implemented on a SharePoint 2010 site. This is due to the integration of SharePoint 2010 and Office 2010.

SharePoint 2010 offers the ability to create either a list workflow or site workflow. List workflows are new to SharePoint 2010 and allow workflows to be attached to an individual list or library. As noted above, SharePoint 2010 External Lists do not allow workflow management through the direct association of business process to the list items. This is due to the fact that SharePoint 2010 as a system does not have visibility over the external data used. For example, if a data source is independently modified outside of SharePoint 2010, a workflow process cannot be triggered by SharePoint.

A new feature in SharePoint 2010 workflows is the ability to reuse workflows. Reusable workflows could be indirectly implemented in SharePoint 2007[18]; but this functionality is now directly included in SharePoint 2010. This feature is available on the ribbon toolbar in SharePoint Designer 2010 and requires no third party plugins[19].

8. Office Integration

Both SharePoint 2007 and SharePoint 2010 integrate with Microsoft Office, however in the case of SharePoint 2010 and the Office 2010 suite, integration is much improved. The following sections show comparisons between SharePoint 2007 with Microsoft Office 2007 and SharePoint 2010 with Office 2010. *Note: The following tables do not completely list the features of SharePoint's integration with Microsoft Office.*

8.1 Outlook Integration

Table 4 SharePoint integration with Microsoft Outlook comparison

Feature	SharePoint 2007 & Office 2007	SharePoint 2010 & Office 2010
Take SharePoint lists offline	✓	✓
Overlay Calendars	Partial support	✓
Connection to SharePoint social features (i.e. team discussion)	✗	✓
Task list management	✓	✓ Improved
Synchronise tasks, lists, documents and contacts	✓	✓ Improved

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[18] An example of creating reusable workflows in SharePoint 2007 is seen here
<http://jasonagraham.wordpress.com/2009/06/16/sharepoint-designer-2007%E2%80%94reusable-sharepoint-designer-workflows/>
[19] An example of creating reusable workflows in SharePoint 2010 is seen here
<http://sharepointyankee.com/2010/12/11/options-for-deploying-reusable-workflows-in-sharepoint-2010/>

8.2 PowerPoint Integration

Table 5 SharePoint integration with Microsoft PowerPoint comparison

Feature	2007	2010
Save to SharePoint	✓	✓
View and manage versions	✓	✓
View/Manage/Start workflows	✓	✓
Simultaneous co-authoring documents	✗	✓
Document synchronisation with server	✗	✓
Social integration (tags and notes)	✗	✓
Embedding document into SharePoint page using web part	✗	✓

8.3 Excel Integration

Table 6 SharePoint integration with Microsoft Excel comparison

Feature	2007	2010
Save to SharePoint	✓	✓
View and manage versions	✓	✓
View/Manage/Start workflows	✓	✓
Workflow design	✓	✓
Simultaneous co-authoring documents	✗	✓
Document synchronisation with server	✗	✓
Social integration (tags and notes)	✗	✓
Embedding document into SharePoint page using web part	✗	✓
Excel data slicers	✗	✓

8.4 Word Integration

Table 7 SharePoint integration with Microsoft Word comparison

Feature	2007	2010
Save to SharePoint	✔	✔
View and manage versions	✔	✔
View/Manage/Start workflows	✔	✔
Simultaneous co-authoring documents	✘	✔
Set Managed Metadata properties	✘	✔
Document synchronisation with server	✘	✔
Social integration (tags and notes)	✘	✔
Embedding document into SharePoint page using web part	✘	✔
Excel data slicers	✘	✔

8.5 Visio Integration

Table 8 SharePoint integration with Microsoft Word comparison

Feature	2007	2010
Save to SharePoint	✘	✔
View and manage versions	✘	✔
View/Manage/Start workflows	✘	✔
Build workflows	✘	✔
Import Visio workflows to SharePoint Designer	✘	✔
Embedding document into SharePoint page using web part	✘	✔

SharePoint 2010 introduces the Visio Web Services and Access Web Services to accompany the Excel Web Services of SharePoint 2007. The Visio Web Services allow the publication of Visio web drawings to SharePoint pages, and Access Web Services perform an analogous role for Access databases.

9. SharePoint Designer

Microsoft Office SharePoint Designer (SPD) is an application used to build SharePoint sites without the need for programming skills. It is not technically part of the SharePoint server package, but a useful option offered as a free download from the SharePoint related technologies pages. SPD is an evolution of a predecessor product: Microsoft FrontPage, which was an application that was intended to allow web site creation and management. SPD is instead designed to edit SharePoint sites rather than design and publish generic Web sites, while providing more functionality than in-browser editing. It should be noted that for some editing capability, SPD will simply invoke the in-browser editing by opening up specific pages in a web browser.

SharePoint Designer is a second option for the development of "no-code" solutions for SharePoint, providing additional capability above and beyond the options available in the web browser interface. The third tier of advanced development requires coding through the use of Visual Studio 2008, or 2010 for additional support for SharePoint development solutions (Figure 8 below). Additional capability available in SPD includes: adding custom actions (i.e. adding additional buttons to the Ribbon interface), applying conditional formatting to lists, applying parameters for additional filtering of lists, custom workflow design, creating BCS data sources and linked data sources[20], External Content Types and External Lists. SPD also permits the creation and customisation of master pages, which control the look and feel of SharePoint sites.

SharePoint Designer 2010 has been developed for SharePoint 2010; it is not compatible with SharePoint 2007 (which requires SPD2007). This is due to the change in application use emphasis between versions of SharePoint Designer from 2007 to 2010 which are detailed below in the discontinued features section.

SPD provides navigation bar functionality for accessing and managing SharePoint Lists & Libraries, Workflows, Site Pages, Site Assets, Content Types, External Content Types, Data Sources, Subsites, etc. In addition to managing these SharePoint components, SPD is able to create and manage permission groups[21] controlling access to the site components. SPD presents an editor window in its main pane for managing the site components loaded from the navigation bar.

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[20] Linked data sources are used to merge or join two different data sources, which may be SharePoint lists, libraries, database connections (with optional query selections), XML files or web services, or even other linked sources. Merge linked data sources combine the sources in a union of all the items which may then be sorted by the user viewing the source when displayed in a web part. Join linked data sources use a common element in the items of the two sources to perform an intersection of the two sources, providing only those items in both sources that share the common element (e.g. some identifier).

[21] But not the permission levels that are assigned to permission groups. **NB:** SharePoint Designer 2010 invokes the in-browser permissons management pages for this functionality.
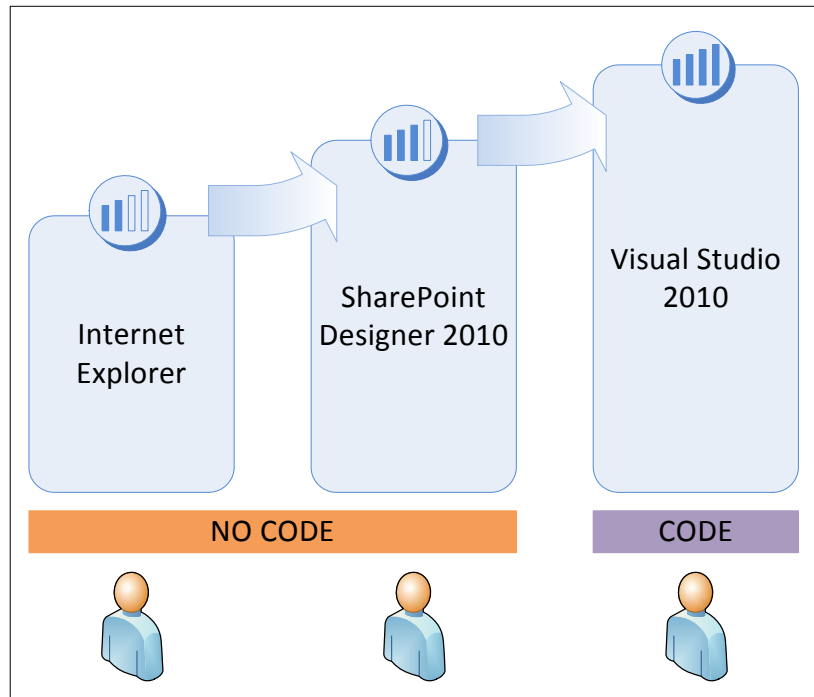
Figure 8   Three Tiers of SharePoint Development

9.1 SharePoint Designer Discontinued Features

The following section partially summarises the information available from the Microsoft Office SharePoint Designer 2010 web site[22]. Information on various changed application views, FTP[23] client, and customising ("unghosting") pages is deemed irrelevant and therefore not given here.

9.1.1 Remote access and content migration

SharePoint Designer no longer allows for server administration such as backup, and restore, content migration. Such operations are now intended to be performed through SharePoint Central Administration (a web application in its own right dedicated to SharePoint site (collection) management and administration), or through Windows PowerShell (for SharePoint) commandlets.

9.1.2 Earlier SharePoint server version functionality

As mentioned previously, SPD 2010 is targeted specifically at SharePoint 2010 sites. SharePoint Designer 2007 is available for editing SharePoint sites hosted by earlier versions of SharePoint.

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[22] Discontinued features in SharePoint Designer 2010, available at: <http://office.microsoft.com/en-us/sharepoint-designer-help/discontinued-features-in-sharepoint-designer-2010-HA101782644.aspx> © 2012 Microsoft Corporation, viewed 8 February, 2012.

[23] File Transfer Protocol (*File Transfer Protocol (FTP)*, 1985)

9.1.3 Script Editing

The Microsoft Script Editor from previous versions is discontinued in SPD 2010; as such there is no support in SPD to edit HTML tags or VBScript.

9.1.4 Contributor Rights

Earlier versions of SPD allowed a Contributor permission mode which could grant additional permissions to users depending on the group to which they were assigned. SharePoint 2010 instead allows the use of the SharePoint Designer Settings page[24] to control access to various capabilities in SPD2010 when editing pages within specific site collections.

9.1.5 Single Sign-On

As noted above, Single Sign-On has been removed from SharePoint 2010 and replaced with the Secure Store Service; this impacts on SPD 2010 as well.

9.1.6 Layout Tables

Earlier versions of the product permitted the use of layout tables in designing web pages; these are replaced by CSS[25] layout features in SPD 2010. While the product will function correctly with web pages that have layout tables, it cannot create nor modify them.

9.1.7 Web package files Import

SharePoint Designer no longer has the capability to import web package files, as this is not required when working with SharePoint 2010. As SPD is incompatible with earlier SharePoint server versions this functionality has been removed. Packaged functionality in SharePoint 2010 is available now as either custom site templates, or use the SharePoint Foundation 2010 solution framework which is able to bundle together, package and deploy features, site definitions, and assemblies.

The significance of SharePoint Designer is that with the right level of permission to sites and data sources, "power" users are able to quickly develop custom solutions to meet their needs without having to resort to the services of the "IT shop" or "business unit".

10. InfoPath 2010

Microsoft InfoPath is a program that facilitates the creation, design and publishing of electronic forms[26]. It is integrated into SharePoint by using InfoPath Form Services, which is available in the Enterprise Edition of SharePoint (2007 and 2010). InfoPath can be used to design custom forms for Internal Lists (also External Lists in SharePoint 2010) to replace, or supplement, the default New/Edit/Display forms. InfoPath 2010 improves on its predecessor (InfoPath 2007) primarily in its richer form components and improved user interface.

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[24] From Site Collection Administration, in the Site Settings pages from the Site Actions menu on the Ribbon.
[25] Cascading Style Sheets (*Cascading Style Sheets Level 2 Revision 1 (CSS 2.1) Specification*, 2011).
[26] InfoPath 2010 is included in Microsoft Office 2010 Professional Plus

Unlike InfoPath 2007, InfoPath 2010 has been split in to two products – InfoPath Designer 2010 and InfoPath Filler 2010. InfoPath Designer is akin to InfoPath 2007 in that it is used to primarily design and publish forms. InfoPath Filler is a utility program designed to allow a user with InfoPath installed to populate and submit form data to the data source specified in form creation. It provides a different user interface for power users to efficiently submit data using their custom designed form.

10.1 Presentation

InfoPath 2010 adopts the same ribbon interface used by the Office 2010 suite.

10.2 Integration with SharePoint 2010

A new feature of InfoPath Designer is the ability to create InfoPath 2010 forms from within a SharePoint 2010 Internal list. The ribbon bar contains a "Customize Form" button which opens the form in InfoPath Designer (as seen below in Figure 9). Editing a form in InfoPath Designer, rather than SharePoint Designer provides the form developer with greater control over the form's layout and underlying functionality.
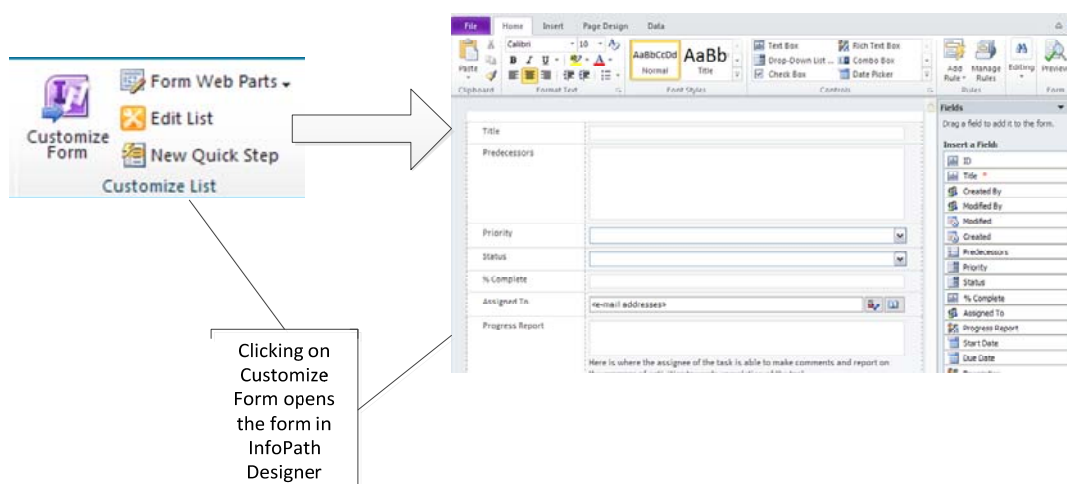

Figure 9   Editing a List Form in InfoPath Designer (from the Ribbon)

SharePoint 2010 provides a new web part that allows the presentation of InfoPath forms on SharePoint. This is distinct from the modal dialog in which the default list forms are normally instantiated. It is able to take any InfoPath-created form that has been published to the SharePoint site (using the "publish" feature of InfoPath) and present it in an InfoPath Form Web Part. As shown below in Figure 10, a form from a list can be placed on any page within a SharePoint site. It can then be used to submit data to the underlying data source.
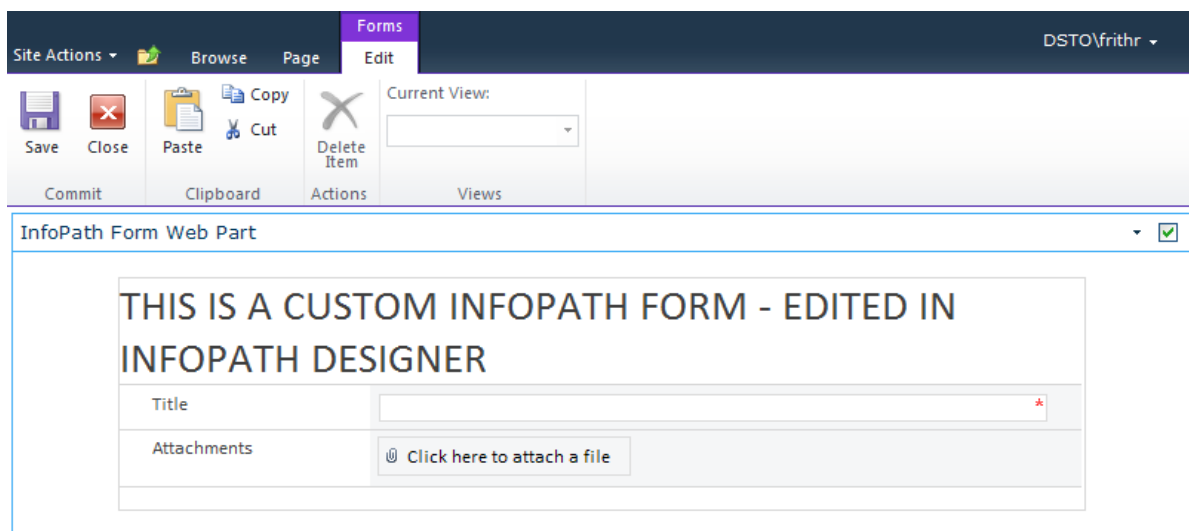
Figure 10   Example of InfoPath Form Web Part

A custom form created in InfoPath Designer can connect to external data using BCS. InfoPath Designer allows the user to select external data using the External Data Picker. This connects to the external data source via BCS and allows a value from an External Content Type to be used in the form (this is specified by an administrator when the External Content Type is created). InfoPath Designer can also be used to input data directly into an External Content Type (through an External List). This provides an alternative to the SharePoint 2010 default New/Edit forms.

10.3 Form Debugging

InfoPath 2007 natively provided a feature that allowed debugging of forms via Visual Studio 2008. The form developer was able to create a project in Visual Studio 2008 that allowed the program to be attached to an IIS[27] process in order to debug a form. This has been removed from InfoPath 2010 and also from Visual Studio 2010. However, there are third party tools and free plug-ins that bridge the functionality gap.

10.4 Form Design

InfoPath Designer 2010 introduced a richer array of tools that can be incorporated into a SharePoint 2010 form. These include: combo boxes; formatted lists; picture buttons; hyperlinks; choice group and selection; date/time controls; and person / group pickers ("people pickers"). The people picker tool is an important upgrade to InfoPath Designer's integration with SharePoint 2010. It allows lists that have references to users (for example, an "Assigned To" field for a tasks list) to have forms created in InfoPath without further manipulation of the underlying form (i.e. code development).

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[27] Internet Information Services is Microsoft's offering into the Web server product range.

10.5 Additional Functionality

The following points are drawn from Microsoft's Office product suite website[28,29], detailing additional enhancements and benefits of InfoPath 2010 listed below.

SharePoint Application Development. SharePoint 2010 and InfoPath 2010 can be used conjunctively to quickly develop powerful SharePoint applications with little to no-code development required. Embedding declarative logic and layout features provide validation, formatting and actions to be added to a form without requiring coding.

Standards Conformance. InfoPath 2010 forms are now conformant to Web Content Accessibility Guidelines 2.0 (WCAG 2.0) to create forms that are accessible to users with disabilities.

Offline form population. Using the SharePoint Workspace environment, users are able to take a SharePoint library (or list) offline to work without connectivity to the SharePoint server. Information will be then synchronised with the SharePoint server when connectivity is restored.

Workflow Integration. SharePoint Server 2010 allows the integration of SharePoint workflows and InfoPath forms such that forms can be invoked as part of the workflow. Previously, in SharePoint 2007, the level of integration was much less; forms could be stored in a form library in SharePoint but would need to be specifically loaded into InfoPath and associated workflows required manual triggering.

11. Conclusion

In this report we have presented a number of cases where SharePoint 2010 offers significant benefit to Defence (projects) employing earlier versions of SharePoint. In conclusion we wish to raise a number of technical and policy issues that should be addressed in the undertaking of rolling out various elements of the functionality.

11.1 External data access

When considering a SharePoint solution for Defence systems, especially those that require the integration of data external to the proposed system, careful analysis is required as to which approach best suits the solution. In some cases it may be practical to incorporate the data directly into the SharePoint system as internal content. Such cases would be those where there is no call for the information to be made available to non-SharePoint applications. In other cases sustaining the external nature of the data is the sensible decision, in which case choices must be made as to how the information is to be integrated. Fundamentally, whether the data needs to be made available for editing within / through SharePoint interfaces, is the most basic question. Such decisions should be undertaken in the process of planning the Information Architecture of the system in question. Planning the Information Architecture is itself a significant undertaking, and is outside the scope of this report.

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[28]Located at <http://office.microsoft.com/en-us/infopath/top-10-reasons-to-try-infopath-2010-HA101809016.aspx>, accessed 30 April, 2012.
[29] Located at <http://office.microsoft.com/en-us/infopath/infopath-2010-features-and-benefits-HA101806949.aspx>, accessed 30 April, 2012.

External data sources may not be amenable to acess through Business Connectivity Services, such as when they are non-SQL Server databases. In this instance, without additional overhead to provide wrapper functionality (such as a BCS-compatible web service) access to the data is constrained to a read-only nature.

In the instance that it is possible to employ BCS, questions need to be addressed as to whether to go with BCS with direct authentication to the source or to use a proxy SSS solution instead. The former approach requires user privilege be granted on a case-by-case basis, perhaps corresponding to user access to the SharePoint site elements that exploit the external data. This imposes an approval and maintenance overhead, while granting greater assurance of access control versus a sole privileged account in SSS (but see below for further discussion).

11.2 Security concerns regarding the BCS/SSS proxy solution

In exploiting the SSS as a proxy authentication for external systems accessed through BCS, the actual user identity is masked by the proxy account at the data source. In other words, at the originating source of the external information, whether it is a database or web service, the identity of the requestor using SharePoint is unknown, and all access to the source will be accredited to the proxy account. This poses concerns for maintaining an audit trail in Defence systems, which is a significant security, if not legal, issue.

SharePoint logging can record extensively across the operations and requests that the services receive. While not all logging is enabled by default, it is possible to increase logging levels to assure that user's activity on the site is recorded in sufficient detail to capture BCS-related activities (this may require some extrapolation from known BCS-related resources to specific user requests against those selfsame resources). Correlating activities recorded by SharePoint to activities recorded by the external data source's own logging becomes an information fusion process, presenting only (in our opinion) an implementation difficulty. Defence systems that employ SharePoint and BCS to integrate external data may require additional functionality to improve the auditing process for parties required to investigate audit trails, by adding this log unification process as an application to the system.

11.3 The functional extent of no-code solutions in SPD2010

Questions have been raised within our team as to the functional bounds of the visual development paradigm, as discussed in §9. In particular the question is whether the "no-code" solution aproach is amenable to analytic processing or confined to presentation functionality only? The bounds of the no-code solution into presentation/analytic processing are dependent upon where one draws the line between the two types of processing. While no-code solutions do not provide much opportunity to implement business logic-type operations, certainly significant analytic-like processing such as sorting, filtering, conditionally formatting, joining or merging, and querying data can be developed using only the SharePoint Designer interfaces.

Functionally breaking down the aspects of a SharePoint application into distinct components such as presenting the data, and providing custom actions (*e.g.* adding new buttons to the Ribbon interface in addition to scripting the functionality invoked by the buttons) allows a "hybrid" approach. The modularity of a hybrid approach just described can make it difficult to maintain code (and especially to re-deploy the same solution on another site or even another page on the same site). The hybrid approach is perhaps best utilised in the

development cycle, which is finalised by rolling all the functionality in to a single SharePoint Solution that can be packaged and redeployed where needed. In other cases, minor, local customisations of individual sites or site components (lists and libraries) may be appropriately carried out in SPD no-code solutions.

11.4 Business Process Automation

SharePoint 2010 workflow, in conjunction with InfoPath 2010 forms, provides the capability for a moderately sophisticated Business Process Automation (BPA) system, without the need for investing in dedicated software to achieve this functionality. BPA offers the opportunity for significant increases in productivity, which is obviously highly relevant to Defence in light of the ongoing Strategic Reform Program. It is important to note, however, that as in many cases the technology offered is an enabler, not a solution in its own right. BPA is first and foremost a cultural undertaking that requires planning and consideration of aspects such as: (i) what are the business processes; (ii) what are the (information/participant) elements of the process; (iii) what aspects of the business process are amenable to being automated; and (iv) how can the technology best enable the automation to be implemented.

Finally, SharePoint is, and is becoming increasingly so, a highly important technology for Defence. Ongoing investigation within C3ID (C2I Discipline) with regards to SharePoint includes areas such as Business Intelligence, SharePoint integration with other systems, and the role of SharePoint within Service-Oriented Architectures.

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File Transfer Protocol (FTP). (1985) Updated October 1985 [viewed 11 May 2012]. Available from: http://www.ietf.org/rfc/rfc959.txt.

12.1 Additional References

In the development of this report the authors found these two web sites to be of particular use. We include them for further investigation as required.

A feature comparison between SharePoint 2007 and 2010 is available on Noorez Khamis' Blog site at: <http://www.khamis.net/blog/Lists/Posts/Post.aspx?ID=4>, 29 October, 2009, viewed 4 April 2012.

An extensive comparison of SharePoint 2007 vs SharePoint 2010 can be found on Richard Harbridge's blog site at: <http://www.rharbridge.com/?page_id=103>, 30 March 2010, viewed 30 April 2012.

Appendix A - SharePoint 2007 / 2010 My Site Comparison

The following two figures illustrate the visual distinction in presentation of the My Site pages between SharePoint 2007 and SharePoint 2010. Of especial note is the "status" note on the SharePoint 2010 page, as well as tabbed sections below the user profile area which are applicable to the social computing aspects of SharePoint 2010 discussed above (§2.2).
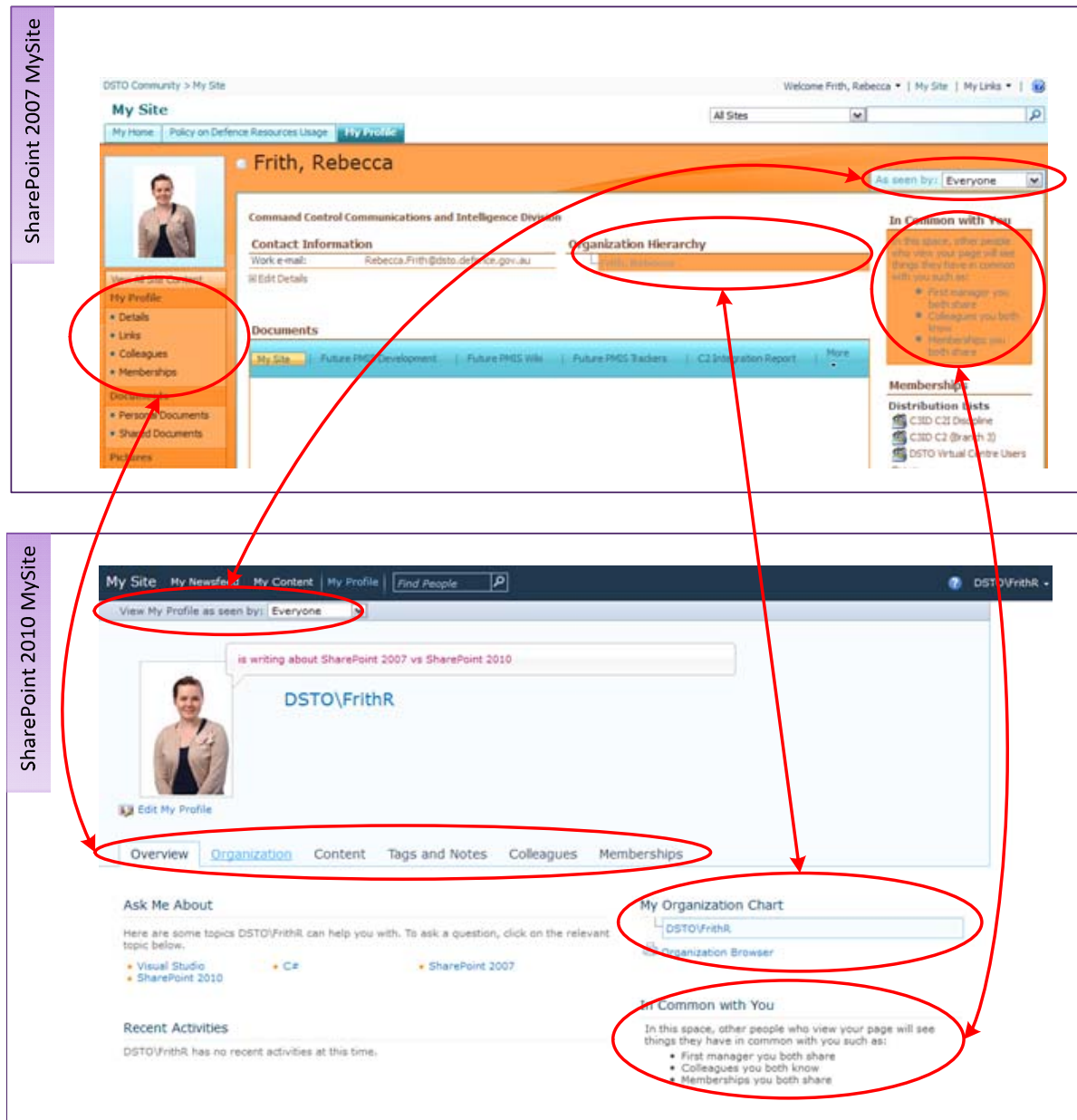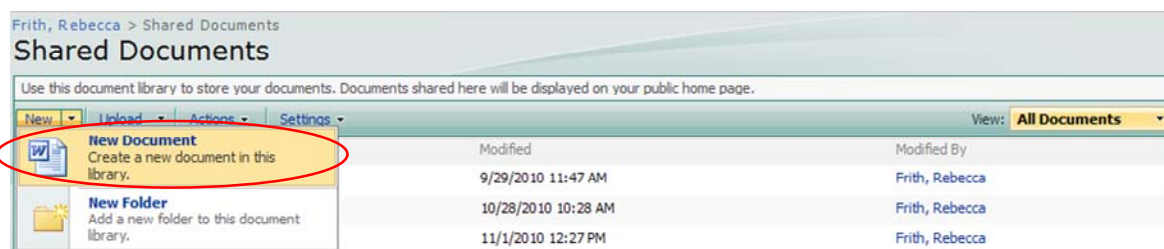

Figure 11   SharePoint MySite 2007 vs 2010

Appendix B - SharePoint 2007 / 2010 List Interface Comparison

The following two figures illustrate the visual distinction in presentation of lists between SharePoint 2007 and SharePoint 2010.

Figure 12   SharePoint 2007 List Interface – Shared Documents
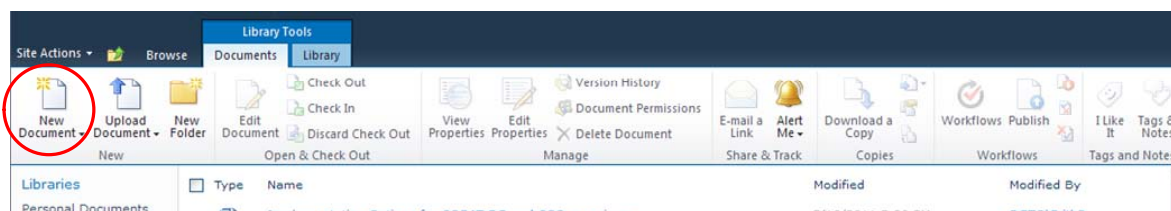
Figure 13   SharePoint 2010 List Interface – Shared Documents

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19. ABSTRACT

SharePoint is a Microsoft product for cooperative and collaborative work. It is becoming an increasingly important technology to Defence, and in particular to Joint Project 2030, where it underpins the JCSE System Infrastructure. SharePoint 2010, the latest version, offers significant increases in capability over its precursor SharePoint 2007. This report seeks to review the differences in capabiliy offerings between the two versions, focussing in particular on integrating external information into a SharePoint environment, reflecting our key area of investigation thus far. We make note of the later release's tighter integration to the Microsoft Office suite of tools, as well as touching on SharePoint Designer and Microsoft InfoPath. We conclude with some cautionary comments regarding the implementation of a SharePoint information architecture in Defence.